RECD AUG 7 1976

GRACE

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AUG 1976
CONSTRUCTION PRODUCTS DIVISION
W. R. G. Co.

Zonolite
Construction Products Division

August 5, 1976

TO: H. A. Brown
H. C. Duecker
J. W. Wolter
J. C. Yang

SUBJ: Controlled Drop Air Sampling, July 23

This records procedure changes and results from the second trials in the Balloon Plant.

I. Procedure - Sampling

Locations A and B were kept the same. New locations C, D, and E were used. They were six inches apart atop a horizontal beam mounted four feet off the floor in the center line of the room just north of the door swing. The beam was positioned atop the vacuum cleaner top plate with cassettes projecting outwards and down from the vacuum cleaner body a minimum of six inches. The background samples (before and after) were the same as previously used.

II. Procedure - Logistic

This was changed in that the first drop was run with the discharge chute half open, and the second one-quarter open for 3 minute and 6-1/2 minute drop times.

III. Material Used

The first drop was run with 5 bags of L#2 used and retained from the July 19 trials and the second drop used the same material again (third time).

The first objective was to see whether air borne fiber gets "out" or principally "out" after a good opportunity such as a slow five foot free fall, or whether fiber will continue being released, such as in shipping and handling.

EXHIBIT
KS
218
8/21/02
Yang

10046350

027PNB00121

The second objective was to gain further information on whether slow or fast discharge releases more fiber, and the third objective was to assess the time versus concentration curve in the Balloon Plant during controlled drop of material.

IV. Discussion

The data on airborne fiber concentrations are shown in the attached two sampling sheets and are also summarized in the attached page of graphs.

1. Background samples were still low (samples BA-1 and 24) at an average of 0.125 f/ml. Perhaps the general fiber in the room is dropping (background of 0.85 last time) as a result of the re-cleaning in the test procedure.

2. Locations A and B again gave relatively consistent readings (averages of 6.95 and 8.91 f/ml. on the two drops). This, combined with the A and B location consistency on the first drops, indicates close-in locations may generate usable data for subsequent use in evaluating materials.

[a. It appears that the closer one samples to the point source of fiber release, the more consistent the results one can expect and the closer the results will be to average actual concentrations in that area.]

[b. Notwithstanding this, individual samples can still vary by +/-50% from actual concentrations under these relatively ideal conditions. As an example, a single plant sample reading of 5.0 f/ml may actually have been 2.5 or 7.5 f/ml under ideal sampling circumstances. If other variables are introduced (Method Reliability, Filter Membrane Sampling, June 11, 1976), results from sampling at close-in locations would be even further afield.]

3. The remote locations (C, D, and E) were again erratic. Pumps whose cassettes were 6" apart, run for approximately the same time periods gave readings three-fold to ten-fold different. This inconsistency appears to rule out use of remote locations for generating data with which to evaluate material.

[c. It appears that the further one samples from the point source of fiber release, the more dynamic localized airborne concentrations, even 6" apart, become. Possibly this is a result of undetectable air currents present even in a closed room. Certainly this occurs in corners or against walls, but this also happens in the open.]

[d. Plant samples--engineering or personnel--not taken adjacent to a point source of fiber release may be subject to great variability even under ideal sampling and lab procedures. For example, forklift driver versus bagger.]

4. Comparing the average of remote samples with the average of close-in samples on all drops to date, the remotes are about 75% of close-in samples. Notwithstanding that individual remote samples are inconsistent, the remote locations about 15 feet from the discharge gate are nearly as high as in a closed room.

[e. In the absence of good ventilation, airborne concentrations well removed from the point source of fiber release are nearly as high as at the point source.]

5. On all drops to date, longer drop times give higher fiber concentrations than shorter ones. It appears that the slower the flow rate during this abnormally long free fall (5 feet), the better the opportunity for fiber exposure to air and release into an airborne concentration. Conversely, the faster the flow rate the less opportunity for fiber exposure to air and possibly adjacent material prevents fibers within the flow from mixing with air and being released to the surrounding air layer.

[f. Users of our products generally tend to pour/dump the bags as rapidly as possible. There are a couple of exceptions to this generalization, but the accidental result is to naturally limit in use concentrations of airborne fiber.]

6. The Libby #2 material used continued to release significant quantities of new fiber with each re-use.

Average, Close-In, f/ml

Date:	July 19	July 23	July 23
Use #:	#1	#2	#3
Drop Rate:	3-1/2 min.	3-1/2 min.	6-1/2 min.
Average:	19.3	6.95	8.91

[g. Following initial removal of a quantity of fiber sufficient to create airborne concentrations double the current ceiling level, it appears expanded vermiculite still retains significant quantities of fiber which can be released in subsequent use. Perhaps due to mechanical abrasion or other explanation, at least in this procedure. Fiber removal may not be feasible and/or initial removal of even a significant quantity of fiber may not, by itself, result in sharply lower airborne concentrations in-use.]

7. Airborne concentrations in the drop room do not peak until approximately fifteen minutes after opening the discharge chute and 8 to 12 minutes after the last material has dropped. Interestingly, maximum levels may be reached at remote locations as soon as at the point source even though the visible dust there is much lower. Apparently, concentrations do start subsiding after 25 to 30 minutes.

V. Other

Consistency appears adequate at the close-in sampling locations, even as between individual samples. Samples at the remote location do not display sufficient consistency for material evaluation. Materials evaluations will commence using data from close-in locations. This is a reversal of the original intent to concentrate on remote.

Total sampling duration will be 30 minutes instead of the 15 minute samples commonly used and originally planned. Those shorter samples alone would probably not reflect different maximum fiber concentrations and might instead mis-record averages during the early build-up period.

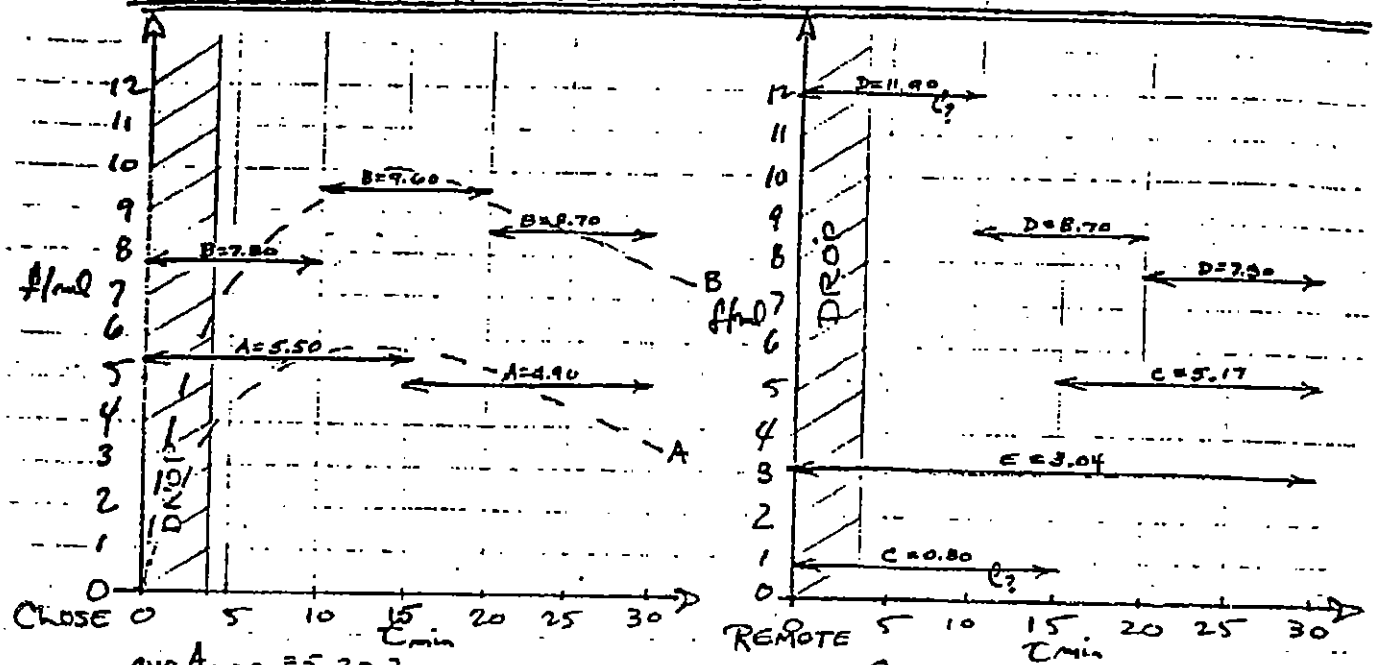
R. H. Locke

RHL/cj

Attachments 3

BALOON PLANT — 23 JULY/76

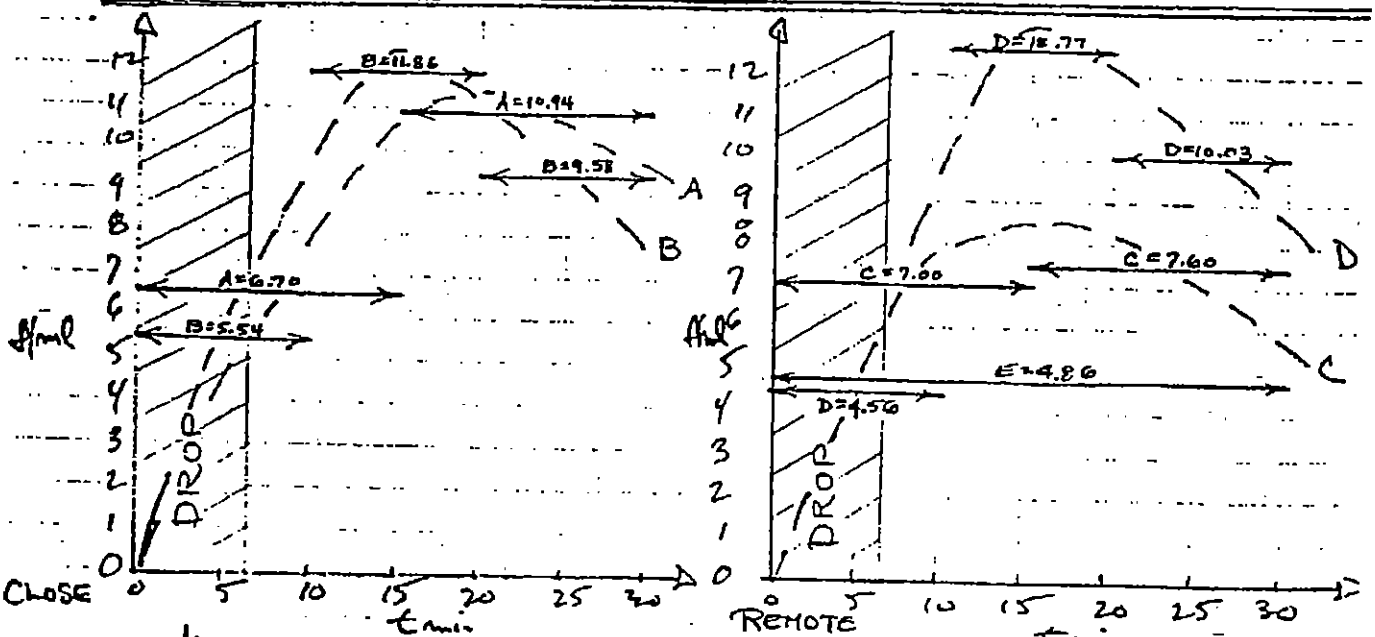
FIRST DROP - REUSED L #2



avg $A_{0\to30}$ = 5.20
avg $B_{0\to30}$ = 8.70
} avg. A & $B_{0\to30}$ = 6.95

avg $C_{0\to30}$ = 2.99
avg $D_{0\to30}$ = 9.47
E = 3.04
} avg. C+D+E = 5.17

SECOND DROP - SAME MATL



avg $A_{0\to30}$ = 8.82
avg $B_{0\to30}$ = 8.99
} avg. A & $B_{0\to30}$ = 8.91

avg $C_{0\to30}$ = 7.30
avg $D_{0\to30}$ = 9.12
E = 4.86
} avg. C+D+E = 7.09

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GRACE B 4

AIR SAMPLING RECORD SHEET

(P) Yarp P12

PLANT LOCATION _____

CONTAMINANT _____

SAMPLING BY STEVE VENUTI

DATE: 2-23-76

SAMPLING CONDITIONS:

OUTSIDE _____

INSIDE DRAFT _____

VISIBLE DUST _____

HOUSEKEEPING: _____

CONFIDENTIAL

Sample Number	Employee Name	Job Location and Description	Remarks	Pump Number	Pump Off	Pump On	Sampling Time	Flow Rate	Total Sampled Volume	Lab Evaluation
BA-1			BKGND@A, DRS O	1CG6	8:58	8:17	41	1.5		0.17
BA-2			A (CLOSE)	1CG6	15 945	0 9:30	15			5.50
BA-3			B (CLOSE)	1CG1	10 940	0 930	10			7.80
BA-4			C (REMOTE)	1CG5	15 945	0	15			0.80
BA-5			D (REMOTE)	1CG4	10 940	0	10			11.90
BA-6			E (REMOTE)	1CG2	3.5 1000	0 ↓	30			3.04
BA-7			B	1CG1	20 950	10 940	10			9.60
BA-8			D	1CG4	20 950	10 940	10			8.70
BA-9	ENGINEERING		A	1CG6	2nd 1000	5 945	15			4.40
BA-10	TEST		C	1CG5	30	15 945	15			5.17
BA-11	TEST	SAMPLES	B	1CG1	30	20 950	10			8.70
BA-12			D	1CG4	30 ↓	20 950	10	↓		7.80

Additional Comments: 3 MIN EACH TIME

Laboratory Evaluation By: Jean P. Wallace

Date: 7-29-76

10046355

GRACE

AIR SAMPLING RECORD SHEET

PLANT LOCATION _____

CONTAMINANT _____

SAMPLING BY STEVE VENDT

DATE: 7-28-76

SAMPLING CONDITIONS:

OUTSIDE _____

INSIDE DRAFT _____

VISIBLE DUST _____

CONFIDENTIAL

HOUSEKEEPING:

_____

_____

_____

Sample Number	Employee Name	Job Location and Description	Remarks	Pump Number	Pump Off	Pump On	Sampling Time	Flow Rate	Total Sampled Volume	Lab Evaluation
BA-13			A	ICG 6	15 1315	0 1300	15	1.5		6.70
BA-14			B	ICG 1	10 1310	0	10			5.54
BA-15			C	ICG 5	15 1315	0	15			7.00
BA-16			D	ICG 4	10 1310	0	10			4.56
BA-17			F	ICG 2	30 1330	0 ↓	30			4.86
BA-18			A	ICG 1	20 1320	10 1310	10			11.86
BA-19			D	ICG 4	20 1320	10 1310	10			12.77
BA-20			A	ICG 6	30 1330	5 1315	15			10.94
BA-21			C	ICG 5	30 1330	15 1315	15			7.60
BA-22			B	ICG 1	30 1330	20 1320	10			9.58
BA-23			D	ICG 4	30 1330	20 1320	10			10.03
BA-24			A BKGRD, DRS.O	ICG 6	1444	14.10	30	↓		0.08

Additional Comments: 6½ MIN FALL TIME

Laboratory Evaluation By: Jean P Wallace

Date: 7-29-76

ENGINEERING

TEST SAMPLE

10046356

MASTER

(3) 1st Priority in Orc Balancing L/SC
(4) 2nd " " " " " /"
(5) 3rd " " " " " "

(000 Tons)
(WSZ 11/16)

	DLT	EQPT	ORES/R	'76 ORG PLAN L/SC	# $000	(1)	MOST RECENT TEST AS OF 1/3/76		
AC	PORTLAND	1-A + 1-H	B	6.2/—	155	7/73	20/10/7 L	3/76	5/1/4 L
	NEWARK	2-D16 + 1-R	B	7.6/—	240	7/73	23/5/8 L	4/76	8/0/1 L
	LA	2-A, 1-D16+1-R	B	6.9/—	362	6/74	14/7/6 L	4/76	9/0/1 L
	SANTA A.	2-D18 + 1-R	S	5.4/—	47	12/75	18/0/8 L	4/76	3/0/0 L
	PHOENIX	1-A, 1-D18+1-R	B	7.3/—	274	12/75	8/0/5 L	4/76	4/0/0 L
				33.4/—					
I-W	MILW	1-A + 1-R	B	4.0/—	213	5/74	10/4/3 L	2/76	1/0/1 L
	W. CHIC.	1-A, 2-D18+2-R	S	6.7/2.7	67	11/75	13/2/1 L/SC	3/76	14/0/0 L
	OMAHA	2-A + 1-R	B	6.2/—	245	2/75	8/7/1 L		
	MINN	2-A	B	5.3/—	131	5/74	10/5/3 L/SC	3/76	2/0/2 L
	WILDER	1-A, 1-D18+1-H	S	7.9/1.8	47	—	—	3/76	4/0/3 L/SC?
	DENVER	1-A + 1-H	S	4.1/—	83	2/75	11/2/7 L	3/76	2/0/1 L
	ST. LOUIS	1-A, 1-D18+1-H	S	8.9/0.4	63	12/74	10/5/5 L	2/76	4/0/1 L
				43.1/4.9					
I-O	T.R. II	1-A + 2-R	B	0.9/3.9	—	9/75	15/0/6 SC		
	KEARNEY II	3-D16, 1-D18+1-R	—	—/29.9	—	11/75	11/0/0 SC		
	L-ROCK J (2)	1-D16+1-H	S	3.7/1.1	—	1/76	9/0/0 SC		
	NSHVL J	1-A	S	0.2/2.6	—	10/72	2/0/0 SC		
	N. ORL (3) J	1-D16 + 1-H	S	4.3/0.9	—	12/74	5/0/0 SC		
				9.1/38.4					
EA	TRENTON (4)	1-A, 1-D16, 1-D18+1-R	S	15.1/—	74	2/75	15/0/1 SC	4/76	15/0/0 L
	WEEDSPT (4)	1-A	S	4.0/2.0	28	7/75	3/0/0 SC	4/76	3/0/1 L
	E. HMPTS (4)	2-A + 1-R	S	5.7/4.8	45	10/75	4/0/0 (SC)	2/76	5/0/1 L/SC
	HUIRKK (4)	1-A, 1-D18+1-R	S	4.0/5.4	43	1/75	11/0/2 (SC)	3/76	8/1/2 L/SC
	NCSL	1-A, 1-D16+1-R	S	4.5/3.9	43	7/75	15/0/4 L	4/76	4/0/0 L/SC
	DRBN.	2-A + 1-R	B	8.5/—	272	—	—	4/76	9/3/2 L
	H. POINT	1-A	B	0.1/6.2	—	8/75	3/0/0 SC		
				41.9/22.3					
ZA	JXNVL II	1-D18 + 1-H	B	0.1/5.1	—	4/75	4/0/0 SC		
	TAMPA II	1-D18	S	—/4.1	—	1/76	All Eng < 2		
	POMPANO	1-D18 + 1-R	S	—/4.6	—	1/76	All Eng < 2		
				0.1/13.8					
X	DLS (5) J	2-A, 1-D18+2-R	S	9.6/—	70	1/76	6/0/4 L		
	S. ANTON (5) J	1-A	B	—/4.8	234	1/76	3/0/0 SC	1/76	3/0/0 SC
	OKLA. CITY (5)	1-A	S	6.7/—	23	1/76	4/2/1 L		
				16.3/4.8					
	TOTAL	27-A, 10 D-16, 15-D18, 7-H, 19-R		143.9/84.2 (278.1)	(2) 2757				

(1) Cost to Convert to 2 fiber, WAS 1/22
(2) Tm Allocated = $2207 or 80% to dr[illegible] $ and "20% [illegible]

027PNB00128

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